REMARKS

Claims 1, 2, 4, and 6-8 are pending in the Application. Claims 1, 2, 4, 7, and 8 are amended. Applicants request reconsideration and allowance in view of the above amendments and the following remarks.

The Claim Amendments

Independent claim 1 is amended to clarify that it is the average sintered particle size of the respective layers which is compared. Additionally, the term "multilayered" is eliminated with respect to the term "substrate layers" because it is the air-fuel ratio sensor itself which is multilayered -- not necessarily the individual component substrate layers. Finally, with respect to the amendments to claim 1, claim 1 is broadened to the extent that the boundary layer is now recited as having an average sintered particle size that is different from that of the insulating substrate layer, whereas previously claim 1 specified that the sintered particle size (not previously identified as being the average sintered particle size) is larger than that of the insulating substrate layer. (Claim 1 still requires the average sintered particle size of the boundary layer to be larger than that of the solid electrolytic substrate layer; claim 8 is narrower than claim 1 in that claim 8 specifies that the average sintered particle size of the boundary layer is larger than that of the insulating substrate layer as well.)

Claim 2 is amended for proper grammar; claim 4 is amended to add a comma; and claim 7 is amended to sharpen the definition of the invention which that claim covers, as well as to remove the term "multilayered" with respect to the substrate layers for the reason explained above with respect to claim 1.

Applicants submit that all amendments are properly supported by the specification and therefore request that they be entered and considered in timely fashion.

The Outstanding Rejection

Claims 1, 2, 4, and 6-8 are rejected under 35 U.S.C. § 103 as being obvious based on Mase et al., U.S. Patent No. 4,861,456, in view of Suzuki et al., U.S. Patent No. 4,177,112. The Examiner continues to maintain that Mase et al. shows all features of the claimed invention except for the relative (average) sintered particle sizes of the respective layers; according to the Examiner, however, that feature would have been obvious in view of Suzuki et al.'s disclosure of first and second electrodes 2 and 3 (which electrodes are formed

by chemical plating, sputtering, vapor deposition, or paste application -- not sintering), which two electrodes are disclosed as having different average grain sizes. Applicants again traverse this rejection for the reasons already of record.

At this time, Applicants wish to emphasize or reiterate certain points they have made previously and to point out certain deficiencies in the Examiner's position and arguments.

First, the Examiner has asserted several times that the context in which features disclosed in a secondary reference are used is irrelevant. See, for example, the Examiner's statement at page 3 of the September 25, 2000 Office Action that

> Suzuki is merely cited for the purpose of showing that one of ordinary skill in the art would select a particle size for a layer larger than the particle size of an adjacent layer if he desires to have a larger porosity than that of the adjacent layer. What difference does it make whether the layer involved is an inner layer or an outer layer, since that does not affect the premise of larger particle size for greater porosity?[1]

It is axiomatic (i.e., it is a basic, fundamental principle of patent law) that there must be some motivation in the art (either in the references themselves or elsewhere in the art) to modify a reference in order to support a rejection under 35 U.S.C. § 103. For the Examiner to assert that the context in which features disclosed in a secondary reference are utilized is irrelevant is effectively the same as asserting that there does not have to be motivation to combine the references. In other words, the Examiner is, in essence, asserting that the simple existence of the feature in the secondary reference, in and of itself, provides the requisite motivation to combine the references. That is incorrect and is the epitome of hindsight-based reconstruction.

Applicants' undersigned representative certainly understands that the Examiner necessarily must use the claims as a guide to search for certain features in the prior art. (Otherwise, the Examiner obviously would have no idea what to search for.) Once the Examiner actually has found the recited features in the prior art, however, the Examiner must cast his or her mind back to the time at which the claimed invention was made and ask

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[1] As Applicants explain in their January 25, 2001 Response to that Office Action, that argument starts with the premise that one having skill in the art already would desire to have a larger porosity in one layer relative to an adjacent layer. (The Examiner has been using porosity as an equivalent to or "surrogate" for average sintered particle size, which, as Applicants have explained previously and reiterate below, is in error.) In other words, the Examiner's argument starts from the conclusion that is supposed to be drawn from the

himself or herself whether, but for the teachings of the subject patent application, there would have been not just reason why a feature disclosed in a secondary reference could be incorporated into a device or method shown in a primary reference, but rather, whether there would have been motivation actually to make such an asserted combination of references. Again, the existence, *per se*, of a feature shown in a secondary reference does not provide the requisite motivation to combine the references; without demonstrating the requisite motivation to combine references -- an analysis which inherently must take account of the context in which features of a secondary reference are disclosed -- the Examiner fails to set forth a proper *prima facie* case of obviousness. Applicants respectfully submit that that has been the case in the present Application.

Second, in the November 22, 1999 Office Action, the Examiner asserted that

> [i]n Mase, since the boundary layer 10 (in '274) or 12 (in '126) is made porous in order to achieve its thermal stress relief characteristic (see col. 6, line 40 of '274 or col. 3, lines 65-67 of '126) in contrast to their neighboring non-porous substrates, it would have been obvious to provide larger sintering particles for the boundary layer than those of their neighboring substrates, because Suzuki teaches the use of coarser particles to obtain larger porosity.

In other words, as noted above in footnote 1, the Examiner implicitly has deemed porosity and sintered particle size necessarily to be directly, positively correlated.

That argument was addressed at the July 12, 2000 interview. The Examiner disagreed with Applicants' explanation that porosity is not necessarily directly proportional to particle size, and the Examiner required Applicants to provide proof to the contrary before the Examiner would change his position.[2] (See the Interview Summary, Paper No. 10.)

In response to the Examiner's requirement to be disproven, Applicants submitted an article, "High Purity/Fine Alumina," from Sumitomo Chemical Company showing that, in some cases, a material can, in fact, have a larger average sintered particle size yet still have smaller porosity than another material.[3] Faced with that article, the Examiner initially

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argument; that is an example of "begging the question," as that expression is properly used, and, as such, is founded on faulty logic.

[2] Applicants question the propriety of so shifting the burden of proof during examination.

[3] Applicants note that the Examiner points out quite correctly that the claims previously did not specify average sintered particle size. Applicants appreciate that observation and have amended the claims accordingly.

asserted that Applicants had misread the relevant data presented therein.[4] Thus, when Applicants demonstrated that they had read the relevant data correctly and that that data does, in fact, disprove the Examiner's assertion regarding porosity and sintered particle size always being positively correlated, the Examiner "counter-argued" in the February 1, 2001 Advisory Action that

> [t]he one slight deviation, sample AKP 3000 can be explained by its higher particle distribution range. It would be reasonable to conclude that if AKP 3000 had the same particle distribution range as AKP 20, AKP 3000 would yield a higher density than the latter. Therefore, the Sumitomo publication is considered to support the Examiner's position rather than Applicant's [sic] position.

Mindful of the requirement of 37 C.F.R. § 1.3 and M.P.E.P. § 714.25 for courtesy, Applicants' undersigned representative respectfully submits that that argument is ludicrous. The Examiner required Applicants to disprove his assertion that particle size and porosity are necessarily directly related. Applicants have done so, and why certain data deviates from what the Examiner believed to be a "hard and fast" rule is beside the point. To argue further that changing in some fashion the product to which the subject data relates so that the results support the Examiner's position supports the Examiner's position is circular and tautological. Of course the data would support the Examiner's position if the product were changed in a manner to achieve that result. To so change the product, however, would make the product a different entity altogether. Therefore, the Examiner's assertion -- that the Sumitomo publication supports the Examiner's position (not Applicants' position) because it is "reasonable to conclude" that if the subject product (AKP 3000) were changed to yield results consistent with the Examiner's assertion, then the Examiner's desired results would be obtained -- is simply untenable.[5]

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[4] The Examiner also pointed to other data disclosed in that article, which data may or may not have been mislabeled in the article. Regardless of whether that data was or was not mislabeled, and therefore regardless of whether the data does or does not demonstrate what the Examiner asserts it demonstrates, that other data, relating to other powder materials, is irrelevant to whether the data on which Applicants are relying demonstrates the point Applicants have been asserting it demonstrates. In other words, the Examiner's reference to the other data is simply a *non-sequitur*.

[5] Applicants submitted a second reference, an article relating to a product referred to as "Sumicorundum," which is consistent with the Sumitomo article in that the Sumicorundum article demonstrates that porosity is not always directly related to particle size. The Examiner's response to that article in the February 1, 2001 Advisory Action (that "even though the discussion on page 2 of the translation [of the Sumicorundum article] tends to suggest that a larger particle size can yield higher density, it is clear from the discussion at

Third, consistent with the Sumitomo article (as well as the Sumicurundum article referenced in footnote 5), Applicants explained in the August 16, 2000 Response to the April 17, 2000 Office Action that "porosity is . . . influenced by the purity or fineness of the materials," elucidating that "when the particle size is uniform (even if an average particle size is larger), an obtained sintered body has a relatively low porosity[, whereas] when the particle size is non-uniform (even if an average particle size is small), an obtained sintered body has a relatively high porosity." In the September 25, 2000 Office Action, the Examiner responded to that argument by focusing (myopically) on the word "fineness," noting that "[t]he word 'fine' is opposite in meaning to the word 'coarse'" and concluding that because "[b]oth of these words deal with the size of a particle[,] Applicant appears to be admitting that particle size influences porosity."

Although the Examiner is correct in that the word "fine" can be used to refer to particle size (e.g., in the case of "fine sand"), the first definition of the word "fine" (Miriam Webster's Collegiate Dictionary, 10th Edition, page 436) is "free from impurity" (e.g., as in the context of "fine crystal" or "fine china"), and clearly that is the manner in which Applicants used the terminology. That is quite clear from Applicants' immediately preceding reference to the purity of the materials and the immediately following explanation that when the particle size is uniform -- i.e., when the product is relatively free from impurities -- the porosity of the sintered body is lower (even when larger particle size is used) than the case in which the particle size is non-uniform -- i.e., when the powder from which the product is made is not as free from impurities. For the Examiner to contort Applicants' argument by "latching onto" the word "fineness," taking it completely out of the context in which it clearly is used and relying on a definition that clearly was not the intended usage of the word, and then to assert from that that Applicants have admitted the Examiner's position, is patently unfair and clearly improper.

In view of the foregoing, Applicants have defined their invention in a manner which patentably distinguishes it over the prior art presently of record -- certainly, the Examiner has

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page 1, second paragraph from the bottom, of the translation that that result is achieved by having a narrow range of particle size") is irrelevant for the same reasons the Examiner's arguments as to why AKP 3000 deviates from his perceived hard-and-fast rule are irrelevant.

failed to set forth a proper *prima facie* case of obviousness of the claims over the art presently of record -- and Applicants request prompt allowance of this Application.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached Appendix is captioned **"Version with markings to show changes made"**.

Respectfully submitted,

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

1. (Four times amended) A multilayered air-fuel ratio sensor having a plurality of stacked layers comprising:

a plurality of [multilayered] substrate layers comprising at least one solid electrolytic substrate layer and at least one insulating substrate layer; and

a boundary layer interposed between said solid electrolytic substrate layer and said insulating substrate layer;[,]

wherein said boundary layer has [a] an average sintered particle size larger than that of said solid electrolytic substrate layer [or] and different from that of said insulating substrate layer.

2. (Thrice amended) The multilayered air-fuel ratio sensor according to claim 1, wherein said boundary layer has a porosity larger than [those] that of said substrate layers.

4. (Four times Amended) The multilayered air-fuel ratio sensor according to claim 1, wherein said boundary layer comprises a component selected from the group consisting of alumina, spinel, and steatite.

7. (Proposed Amended) The multilayered air-fuel ratio sensor according to claim 1, wherein said [multilayered] substrate layers comprise a plurality of solid electrolytic substrate layers, and said boundary layer is interposed immediately between two consecutive solid electrolytic substrate layers without any other intervening layer.

8. (Twice amended) The multilayered air-fuel ratio sensor according to claim 1, wherein the average sintered particle size of said boundary layer is larger than that of [said solid electrolytic substrate layer and] said insulating substrate layer.